

### **REMARKS**

Claims 1-41 are currently pending in this application. For the reasons set forth below, Applicant believes that the rejections should be withdrawn and that Claims 1-41 are in condition for allowance.

### **REJECTION OF CLAIMS 1-10 UNDER 35 U.S.C. 102(b)**

The Examiner rejected Claims 1-10 under 35 U.S.C. 102(b) as anticipated by U.S. Patent No. 5,995,385 to Shimamura ("Shimamura"). In order to anticipate a claim under 35 U.S.C. 102(b), a reference must disclose each and every element of a claim. As discussed below, this rejection is respectfully traversed.

#### **Claim 1**

In rejecting Claim 1, the Examiner alleged that Shimamura discloses the elements recited by Claim 1, but did not provide citations to Shimamura that describe the configuration of the elements recited by Claim 1. For example, in rejecting the first series circuit recited by Claim 1, the Examiner cited the transformer 30 and the main switch 9 of Shimamura. The transformer "comprises a primary winding 31, a secondary winding 32, an auxiliary winding 4, and a driver winding 40." (Column 8, lines 20-22). It is believed that the Examiner is alleging that the primary winding 31 and the main switch 9 describe the first series circuit recited by Claim 1.

Claim 1 also requires that the saturable reactor be *connected in parallel* with the primary winding of the transformer. (*emphasis added*). This aspect of the invention of Claim 1 is described in various sections throughout the specification. (*See e.g.*, Figs. 5 and 11 and corresponding sections of the specification). The DC converter of the present invention requires that the saturable reactor SL1 be connected in parallel with the primary winding 5a of the transformer T. (Fig. 5 and corresponding section of the specification).

Shimamura does not disclose a saturable reactor connected in parallel with the primary winding, as required by Claim 1. Shimamura discloses a cut-off circuit 8b

connected in parallel with the auxiliary winding 4. (See Fig. 1(b); Column 9, lines 15-22 and Column 12, lines 17-38). The cut-off circuit 8b of Shimamura is connected between the source and gate terminals of the auxiliary switch means 3. (See Fig. 1(b) and Column 12, lines 24-27). Since the Examiner appears to have alleged that the primary winding 31 of the transformer 30 of Shimamura describes the primary winding recited by Claim 1, for consistency, the Examiner must show that the reference describes a saturable reactor in parallel with the primary winding 31. Shimamura does not describe or even suggest the cut-off circuit 8b being connected in parallel with the primary winding 31. Accordingly, Claim 1 is not anticipated by Shimamura.

The claimed configuration of the elements results in an operation that differs from the operation of the circuit described by Shimamura. As illustrated in one embodiment of the invention illustrated by Figure 5, as the first switch Q1 is turned on, current passes through the primary winding 5a as well as the saturable reactor SL1, whereas Shimamura discloses that as the main switch 9 is turned on current does not pass through the cut-off circuit 8b and thus current does not flow through the saturable reactor. Additionally, in the present invention the second switch Q2 is turned off by the control circuit 10, whereas the auxiliary switch 3 of Shimamura is turned off by the cut-off circuit 8a/8b.

Furthermore, as shown in Figure 5 a first return circuit Q2, C3 including a snubber capacitor that returns energy accumulated at the saturable reactor SL1. Shimamura teaches away from the present invention, because it discloses a snubber circuit 3, 7 including a snubber capacitor 7 that is not configured to return energy accumulated at the cut-off circuit 8b because the cut-off circuit is not connected in parallel with the primary winding 31 of the transformer.

Additionally, in rejecting Claim 1, the Examiner alleged that the diode 20 and capacitor 21 of Shimamura (Fig. 1(a)) correspond to the rectifying/smoothing circuit connected in parallel with the secondary winding, recited by the claim. Shimamura describes that when a power supply voltage having a commercial frequency is applied between input

terminals 11, 11', it is full-wave-rectified by the diode bridge 20 and smoothed by the smoothing capacitor 21. (Column 8, lines 14-19). The diode bridge 20 and smoothing capacitor 21, as cited by the Examiner, are connected in parallel with the input terminals. They are not connected in parallel with the secondary winding 32. (See Fig. 1(a)).

Shimamura does not disclose each and every element of Claim 1. Accordingly, Claim 1 is patentable over Shimamura.

#### **Claims 2-10**

Claims 2-10 depend from Claim 1. Accordingly, for at least the same reasons discussed above, Claims 2-10 are patentable over Shimamura.

#### **REJECTION OF CLAIMS 11-41 UNDER 35 U.S.C. 103(a)**

The Examiner rejected Claims 11-41 under 35 U.S.C. 103(a) as being unpatentable over Shimamura in combination with Applicant's prior art Figure 1 ("PA 1"). The Examiner has not established a prima facie case of obviousness. As discussed below, this rejection is respectfully traversed.

#### **Claims 11-41**

Claims 11-41 depend from Claim 1. As discussed in more detail above, Shimamura does not describe a saturable reactor connected in parallel with the primary winding of the transformer. PA 1 does not describe this feature either. Accordingly, for at least the same reasons discussed above with regard to Shimamura, all the features or elements of Claims 11-41 are not obvious in view of Shimamura in combination with PA 1. Thus, Claims 11-41 are patentable over Shimamura in combination with PA 1.

#### **Claim 21**

Additionally, with respect to Claim 21 the cited references neither teach nor render obvious all features or elements of the claim. Neither Shimamura nor PA 1 teach or suggest a DC converter further comprising at least one tertiary winding wound around a core of the transformer and loosely coupled with the primary winding of the transformer, and each of the

tertiary windings provided with the rectifying/smoothing circuit having the rectifying element and the smoothing element, as recited by Claim 21.

In one embodiment of the invention illustrated in Figure 14, a first end of the tertiary winding 5c is connected to an anode of the diode D2, and a cathode of the diode D2 and a second end of the tertiary winding 5c are connected to the capacitor C2, wherein the diode D2 and capacitor C2 form a rectifying/smoothing circuit. A comparison of Figure 1(b) of Shimamura and PA 1 to Figure 14 of the present invention clearly illustrates that neither Shimamura nor PA1 disclose or suggest a tertiary winding provided with the rectifying/smoothing circuit having the rectifying element and smoothing element, as claimed. Accordingly, Claim 21 is patentable over Shimamura in combination with PA 1.

#### **Claim 28**

With respect to Claim 28 the cited references neither teach nor render obvious all the features or elements of the claim. Neither Shimamura nor PA 1 teach or suggest a DC converter including a rectifying/smoothing circuit that further comprises a fourth reactor connected between the smoothing element and the secondary winding of the transformer, a third switch connected in parallel with the rectifying element and having a control terminal connected to a second end of the secondary winding, and a fourth switch connected in parallel with a series circuit of the third switch and secondary winding and having a control terminal connected to a first end of the secondary winding, and a second rectifying element connected in parallel with the secondary winding of the transformer through the third switch, as recited by Claim 28.

In one embodiment of the invention claimed by Claim 28, which is illustrated in Figure 36, a fourth reactor L1 is connected between the smoothing element C4 and the secondary winding 5b of the transformer T, a third switch Q3 is connected in parallel with the rectifying element D1 and has a control circuit connected to a second end of the secondary winding 5B, and a fourth switch Q4 is connected in parallel with a series circuit of the third switch Q3 and secondary winding 5b and has a control terminal connected to a first

end of the secondary winding 5b, and a second rectifying element D82 connected in parallel with the secondary winding 5B through the third switch Q3. Neither Shimamura nor PA1 disclose or suggest a rectifying/smoothing circuit comprising a fourth reactor, a third switch, a fourth switch, and a second rectifying element, as claimed. Accordingly, Claim 28 is patentable over Shimamura in combination with PA 1.

### **CONCLUSION**

The foregoing is submitted as a complete response to the Office Action identified above. Applicant believes that this application is now in condition for allowance and solicits a notice to that effect. If there are any issues that can be addressed via telephone, the Examiner is asked to contact the undersigned at 404.685.6799. The Commissioner is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account 11-0855.

Respectfully submitted,

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